Between the Trees and the Peak

Invasive plants in the subalpine shrublands of Hawai‘i Volcanoes N.P.

Often marginalized when compared to Hawaii's lush forests or spectacular coastlines; above the iconic koa and ‘ōhi‘a trees lies the subalpine shrublands. For rare and endangered Hawaiian plants, the cool and relatively dry climate above the trade wind inversion layer (the cloud layer often seen on Hawaiian mountains) is what makes this community special. But the native species are not alone on these high slopes. Although the subalpine vegetation spanning the Kahuku and Mauna Loa Strip areas of the park has seen minimal disturbance compared to lowland areas, invasive nonnative plants still present a real threat. To make matters worse, climate change is predicted to alter the inversion layer resulting in potentially adverse conditions for these native plant communities.

Despite a long history of plant management in Hawai‘i Volcanoes National Park, few studies have focused on the difficult-to-access subalpine shrublands. The early detection of nonnative plants in this area is essential. It allows the park to target invasions at their initial stages, thus reducing future ecological and monetary costs.

In 2011, the Inventory & Monitoring Program surveyed 20 transects (5 m x 500 m each) for invasive nonnative plants in four subalpine zones: northwest Kahuku, interior & west Kahuku, above the Ka‘ū Forest, and along the Mauna Loa Strip.

All of the nonnative species detected were herbs or grasses. Over half (65%) of the transects sampled contained at least one nonnative species, but no single nonnative species dominated more than one percent of any transect. This is a good sign that the native plant communities are still intact.

The greatest number of different nonnative species were found in NW Kahuku (37 nonnative species/transect), and fewest were detected in the Mauna Loa Strip zone (1 species/transect). Not surprisingly, NW Kahuku also had the most land covered by nonnative species among the four surveyed zones. This is likely due to the abundance of weed-spreading feral sheep and goats.

Every five years, an Inventory & Monitoring Program team will again ascend to the subalpine shrublands of Hawai‘i Volcanoes National Park to assess how the invasive nonnative species are changing, and provide these data to park managers.

Although sometimes forgotten among the rain forests and lava fields of Hawaii, the subalpine shrubland community remains a relatively intact bastion of native plants. Let's keep it that way.

–M. Simon, NPS
Biological technician
–C. Nash, NPS
Science communications

Biological technician Laura Arnold inspects *Rumex acetosella*, an invasive plant also known as sheep sorrel. Overall, the frequency of encountering sheep sorrel in the subalpine shrubland was relatively low. In the Northwest Kahuku zone, however, sheep sorrel was one of the most frequently recurring invasive species; present in 88% of the transect segments. Some animals graze on this plant for food and consequently disperse seeds after they pass through the animals' digestive systems. Sheep sorrel seeds also spread via wind and water, and the plant can reproduce by cloning through its horizontally creeping rhizomes.

Background: native ‘a‘ali‘i (*Dodonaea viscosa*) in the subalpine shrubland.